

Math/Music: Aesthetic Links

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Small Changes Lead to Big Results:
The Music of Steve Reich
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Steve Reich

- Born in New York City, October 3, 1936, to the Broadway lyricist June Stillman.
- Parents divorce early in his life, resulting in split time between New York and California, and long train rides providing future inspiration for his piece *Different Trains*.
- Piano lessons at a young age were inconsequential. Interest in music blossoms at the age of 14 when he starts studying drums with Roland Kohloff.
- Attends Cornell University from 1953-57 majoring in Philosophy but also taking some music courses.
- Returns to New York to study musical composition, first studying privately with Hall Overton (1957-58) and continuing on at the famous Juilliard School with Bergsma and Persichetti (1958-61).

Steve Reich (cont.)

- Continues on to Mills College in California, earning a master's degree in composition while studying with Luciano Berio and Darius Milhaud (1961-63).
- Settles in San Francisco and writes first acknowledged work *It's Gonna Rain* in 1965.
- Piece demonstrates what would become primary traits of Reich's music: short repeating patterns and stationary harmony. Introduces notion of **phasing**, where rhythmic patterns move in and out of phase.
- Using recordings of an end-of-the-world sermon by a black Pentecostal street-preacher known as Brother Walter, work features two recording tapes which move in and out of phase.
- Reich influenced by minimalist composer Terry Riley as well as the music of John Coltrane and African drumming.

Reich on Phasing

Phase really has to do with the canon ... I picked it up mostly from some of the simpler piano pieces in Bartók's "Mikrokosmos" ... In my early tape pieces "It's Gonna Rain" and "Come Out," you have one tape loop going and another identical loop slipping slightly behind the first one, and what you really have is a unison canon or round where the rhythmic interval between the first and second voices is variable and constantly changing. "Phase" was just a technical word I used at the time to refer to the function of the tape recorders.

From an interview with Steve Reich by Jonathan Cott, 1996.

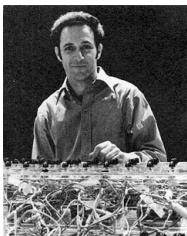
Excerpt from *Violin Phase*

Ex.1 from *Violin Phase* (1969)

vn1
vn2
vn3
vn4
(x 3-5) fade in *f*

- Note there is no time signature. If the quarter note got the beat, it would be in $\frac{6}{4}$; if the eighth note, $\frac{12}{8}$.
- The second violin is two beats ahead of the first.
- The third violin is two beats ahead of the second (or two behind the first). The group structure is \mathbb{Z}_3 (cyclic group of order 3).
- The phase shifting of each part makes it difficult for the listener to discern the start of the measure.

Steve Reich: Early Years



- In 1966, founds his own ensemble *Steve Reich and Musicians* which starts small (3 members) but soon grows to 18 plus. For many years, this is the only ensemble allowed to perform his pieces (doesn't publish anything until mid-1970's).
- Initially performs in museum halls and art galleries instead of concert halls (e.g., Guggenheim Museum in New York).

Steve Reich: Instant Fame

- Upon encouragement by the well-known conductor Michael Tilson Thomas, agrees to have his piece *Four Organs* (1970) performed as part of a BSO series of “new music.” Performance in Carnegie Hall leads to mass chaos — head-banging, heckling, booing. Reich instantly becomes famous!
- Continues to explore his phasing ideas, emphasizing rhythmic pulsation, repetitive patterns and slight harmonic changes. His music is soon classified as **minimalist** (e.g., Philip Glass). Small changes or gradual shifts that appear simple actually lead to quite sophisticated and clever compositions.
- Wins Grammy awards in 1990 for *Different Trains* (1988) and in 1999 for *Music for 18 Musicians* (1974-76).
- Wins **Polar Music Prize** in 2007 and the **Pulitzer Prize for Music** in 2009 for *Double Sextet*.

Some Opinions of Reich

- *“He didn’t reinvent the wheel so much as he showed us a new way to ride.”* – John Adams, 1997, taken from the liner notes to the CD collection Steve Reich: Works 1965 - 95.
- *“My estimation of his music was greatly enhanced soon after when I heard ‘It’s Gonna Rain’ and ‘Violin Phase.’ The pieces were long, witty, spiritual, swinging; and best of all, the notes were great. Hearing those first instrumental pieces was joy like that of hearing Monteverdi, Pérotin, or James Brown for the first time. It was amazing that someone could be discovering so much music with such economy of means. There was something streetwise and at the same time enormously innocent about it.”* – Michael Tilson Thomas, 1997, taken from the same liner notes as above.
- *“America’s greatest living composer”* – music critic Kyle Gann, *The Village Voice*, July 13, 1999.

clapping music

for two performers

steve reich

$J = 160-184$ Repeat each bar 12 times/Répétez chaque mesure 12 fois/Jeden takt zwölfmal wiederholen

1
clap 1
clap 2
f

The first three measures of the piece. Each measure consists of two staves. The top staff (clap 1) has a treble clef and a key signature of one sharp (F#). The bottom staff (clap 2) has a bass clef and a key signature of one sharp (F#). The notation is a rhythmic pattern of eighth and sixteenth notes with rests. A dynamic marking of *f* (forte) is at the beginning of the first measure.

4
5
6

Measures 4, 5, and 6 of the piece, continuing the rhythmic pattern on two staves.

7
8
9

Measures 7, 8, and 9 of the piece, continuing the rhythmic pattern on two staves.

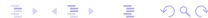
10
11
12

Measures 10, 11, and 12 of the piece, continuing the rhythmic pattern on two staves.

13

Measure 13 of the piece, continuing the rhythmic pattern on two staves. The measure ends with a double bar line and repeat signs.

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Clapping Music (1972): Directions for Performance

Directions for Performance

11 10 10
R4
C5

The number of repeats is fixed at 12 repeats per bar. The duration of the piece should be approximately 5 minutes. The second performer should keep his or her downbeat where it is written, on the first beat of each measure and not on the first beat of the group of three claps, so that the downbeat always falls on a new beat of the unchanging pattern. No other accents should be made. It is for this reason that a time signature of 6/4 or 12/8 is not given – to avoid metrical accents. To begin the piece one player may set the tempo by counting quietly; “one, two, three, four, five, six”.

The choice of a particular clapping sound, i.e. with cupped or flat hands, is left up to the performers. Whichever timbre is chosen, both performers should try and get the same one so that their two parts will blend to produce one overall resulting pattern.

In a hall holding 200 people or more the clapping should be amplified with either a single omni-directional microphone for both performers, or two directional microphones; one for each performer. In either case the amplification should be mixed into mono and both parts fed equally to all loudspeakers. In smaller live rooms the piece may be performed without amplification. In either case the performers should perform while standing as close to one another as possible so as to hear each other well.

Note the attention to detail: length of piece, lack of meter, placement of accents, importance of unified clapping timbre, instructions for electronic amplification, location of performers, etc.

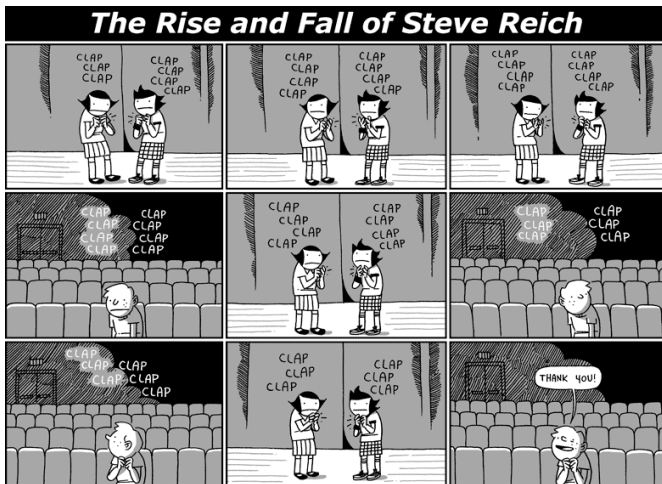


Figure: Source: <http://catandgirl.com/?p=1992>

Clapping Music (1972): Analysis

- Player 1 repeats the same rhythmic pattern (3+2+1+2) throughout. This is a variation of a fundamental African bell pattern – Reich had studied in drumming in Ghana in 1970.
- Player 2 starts in unison but then shifts the same pattern cyclically to the left by one eighth note. Group structure is \mathbb{Z}_{12} , the cyclic group of order 12. Note the retrograde-inversion in Bar 4!
- Players move in and out of phase depending on how the original and shifted pattern match up. By starting with a fairly asymmetric rhythmic figure, Reich is able to create a variety of patterns and structures. Once again, a composer has created much music from a small motif (Bach, Beethoven, Bartók, Haydn, etc.)
- Note the lack of time signature, a feature common to many of Reich's pieces.

Steve Reich

Montserrat Spring 2011

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† Crescendi and decrescendi over repeated measures last for the duration of the complete repetition. Players 4, 5, and 6 should make eye contact and diminuendo together. The same applies for players 5 and 6 at 43 and similarly for other players throughout the piece.

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Measures 14-21. Six staves. Measures 14-15 show melodic lines in staves 1-4. Measures 16-21 show sustained notes in staves 1-4. Staves 5 and 6 have rhythmic patterns with dynamic markings *f* and *mf*. Measure numbers 14, 16, 17, 18, 19, 20, and 21 are indicated above the staves.

Measures 22-27. Six staves. Measures 22-27 show sustained notes in staves 1-4. Staves 5 and 6 have rhythmic patterns with dynamic markings *f* and *mf*. Measure numbers 22, 23, 24, 25, 26, and 27 are indicated above the staves.

Measures 28-34. Six staves. Measures 28-34 show melodic lines in staves 1-4. Measures 32-34 show melodic lines in staves 5 and 6. Measure numbers 28, 29, 30, 31, 32, 33, and 34 are indicated above the staves.

Measures 35-41. Six staves. Measures 35-41 show melodic lines in staves 1-4. Measures 35-41 show melodic lines in staves 5 and 6. Measure numbers 35, 36, 37, 38, 39, 40, and 41 are indicated above the staves.

The Marimba



Six Marimbas, 1986

- Piece is a rescoring for marimbas of Reich's 1973 composition *Six Pianos*. The marimbas provide a more gentle (hypnotic?) sound and are more practical than pianos.
- Four marimbas start playing an identical eight-beat rhythmic pattern on different notes in D \flat major.
- The other two marimbas then enter, at first playing only one beat per measure, then two, then three and so on until they are playing the same rhythmic pattern. However, the players shift the pattern at the outset (phasing), moving it forward two beats (a right shift).
- Once this rhythmic canon is complete, other players begin to accentuate interesting melodic features of the original quartet.
- Piece is structured into three sections with the first in D \flat major, the second in E \flat dorian and the third in B \flat natural minor, although this is hard to notice because of how gradual the changes occur.